Ambition School Leadership

EDUCATION POLICY INSTITUTE

Quantitative analysis of the characteristics and performance of multi-academy trusts

Produced by the Education Policy Institute for Ambition School Leadership

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Contents

Since the original publication of this report we have identified and corrected two typographical errors.

Pages 4 and 20 previously said "69 trusts were high performing in four domains". This now reads "69 trusts were high performing in three domains".

In figure 2.1.1 the chart "Predominant phase of school within trust (trusts with 4+ schools)" previously had 40 secondary groups and now has 70 secondary groups.

These corrections were made on **18 July 2018** and do not affect the conclusions or recommendations reached in this report.

Executive Summary

There are now over 6,000 open academies, free schools, studio schools and university technical colleges open in England, over half of which are in a multi-academy trust. These trusts are diverse, from locally based small clusters of schools to national, 'system leader', trusts with thousands of pupils. Some focus just on one phase of education, others include primary, secondary and special schools.

The analysis in this report investigates the different characteristics of these trusts both in terms of how the MAT is structured and the pupils that attend its schools as well as how these features relate to the outcomes that the trust achieves. It brings together a wide range of publicly available data including Edubase, the school Performance Tables, the School Census, Ofsted, financial data and the Education Policy Institute's performance measures for multi-academy trusts. Further information on the underlying data used in this report is provided in Annex 1.

In terms of multi-academy trust structure we find that amongst the 402 trusts with at least four schools:

- The vast majority are small starter or established trusts with only 13 system leader trusts. The majority have a mix of academy types or are predominantly converter academies and have a mix of phases. Large system leader trusts are predominantly well established academy sponsors rather than chains of converter academies.
- Nearly three-quarters of trusts are tightly clustered with all schools in the trust being within one hour's travel time of all other schools in the trust, however there are 12 trusts where more than a fifth of schools are isolated. There is some evidence of school isolation being addressed over time.
- Nearly half of trusts have experienced at least one incidence of rapid growth within the past five years. Ten trusts grew from new to national or system leader trusts within five years.

In terms of the characteristics of pupils in multi-academy trusts we find that:

- System leader trusts and predominantly sponsored trusts have more pupils for whom English is an additional language (EAL), or who are eligible for the pupil premium or who have low prior attainment than other trusts.
- Clustering and isolation of schools does not appear to be correlated with pupil characteristics and it is likely that any differences relate to the types of schools and trusts rather than their location. Similarly the phase mix of schools is not strongly correlated with pupil characteristics.
- Trusts that have expanded rapidly at some point over recent years tend to have slightly higher levels of EAL, low prior attainment and pupils eligible for the Pupil Premium.

The relationships we describe here relate to the average (median) MATs within each group but there is variation within each group. With some exceptions, the characteristics of pupils within any MAT relates to the individual circumstance of that trust rather than being linked closely to their structure (size of trust, mix of school types within the trust, geographic spread, phase mix and rate of growth in the trust).

In terms of the performance of multi-academy trusts we find that:

- System leader trusts are more likely to be driving improvements at Key Stage 2 than other trusts, though there is little difference in outcomes at Key Stage 4. When considering income and expenditure across the MAT as a whole, relatively high expenditure was seen more frequently in established and national trusts while system leader trusts had individual schools with relatively high expenditure. This may suggest that system leader trusts are sometimes using funding to cross subsidise their academies.
- Predominantly sponsored trusts are more likely to have demonstrated significant improvements at the end of primary school than converter trusts. Predominantly sponsored trusts are more likely than other trusts to have schools that are rated as inadequate (possibly reflecting historic and continuing performance issues).
- There are few clear relationships between geographic spread within multi-academy trusts and outcomes. We find that tightly clustered trusts are less likely to have schools rated as inadequate than other trusts – these trusts tend to have more converter academies that would be more likely to have higher outcomes prior to conversion.
- There are few clear relationships between the phase mix within a trust and outcomes.
- In relation to growth, the picture at Key Stage 2 is mixed where trusts that have expanded rapidly are slightly more likely to be above average than other trusts in writing, less likely in reading and equally likely in mathematics. They are more likely to have shown good improvement overall at Key Stage 2 (no difference at Key Stage 4) but more likely to have schools rated as inadequate or with relatively high expenditure.
- Of the 402 trusts with at least four schools, we find that no trust was identified as high performing across all five performance domains, 69 trusts were high performing in three domains, and only 14 trusts were identified as not being high performing in any domain.

Based on pupil characteristics and geographic spread we identified five different types of trust:

- **Cluster 1:**
  Small and medium sized MATs in tight geographical clusters and dominated by converter academies.
- **Cluster 2:**
  Small and medium sized MATs in tight geographical clusters with a balance of sponsored and converter academies with some free schools and special /AP schools.
- **Cluster 3:**
  Small trusts, with large numbers of special and alternative provision schools.
- **Cluster 4:**
  Medium and larger trusts generally not in tight geographical clusters with a with a balance of sponsored and converter academies with some free schools and special /AP schools too.
- **Cluster 5:**
  Medium and larger trusts (including system leader trusts) generally not in tight geographical clusters and dominated by sponsored academies.

Part 1: Introduction

This report provides an analysis of the structure, characteristics, and performance of multi-academy trusts in aggregate form. The analysis is intended to help identify those multi-academy trusts that:

- Are effective now (those which demonstrate high progress, high attainment, Ofsted outcomes, low variation, track record of sustainable school improvement).
- Are financially sustainable – as demonstrated by current income and expenditure patterns of schools.
- Have exhibited sustainable growth – as demonstrated by maintaining or improving performance while increasing in size.
- We consider these trusts in terms of phase, mix of academy types, number of pupils, pupil profile, number of schools and geographical spread.

1.1 How we examine the structure of multi-academy trusts

We consider the structure of multi-academy trusts in five ways:

Size of trust

We categorise trusts according to the definition set out by the National Schools Commissioner, this is based on the number of pupils a trust covers.

- <1,200 pupils: starter trusts
- 1,200-5,000 pupils: established trusts
- 5,000-12,000 pupils: national trusts
- 12,000+ pupils: system leader trusts

Most analysis is restricted to trusts with at least four schools. Therefore by definition, many of the starter trusts are excluded. There were a total of 1,178 multi-academy trusts with open schools in Edubase as at January 2017, with 402 multi-academy trusts having at least four schools.

Mix of schools within a trust

We group trusts according to the type of academy that makes up the vast majority of schools within the trust (if that type represents at least 80 per cent of schools in the trust).

- Predominantly converter
- Predominantly sponsored
- Predominantly free school / UTC / studio
- Predominantly special / AP
- Mixed trust (no school type makes up 80 per cent of the trust)

Geographical spread

We have applied a new approach to identifying clusters of schools within multi-academy trusts. For each trust we have calculated the travel time for each pair of schools within the trust using Google Maps.[1] Trusts are then classified as:

- All schools within 1 hour of every other school in the trust
- All schools within 1 hour of at least one other school in the trust
- Some isolation – less than one fifth of schools not within an hour of another school in the trust
- High isolation – more than one fifth of schools not within an hour of another school in the trust

Phase mix of schools within a trust

We group trusts according to the phase of academy that make up the vast majority of schools within the trust (if that phase represents at least 80 per cent of schools in the trust).

- Predominantly primary
- Predominantly secondary
- Predominantly special / AP
- Mixed trust (no school phase makes up 80 per cent of the trust)

Growth

There are a number of ways to categorise rate of growth of a trust. Our primary approach is to identify trusts that had rapid growth within a given year. We define rapid growth as pupil numbers increasing by at least 20 per cent in one year.[2] We have also identified trusts that moved between one of the size groups between 2012 and 2016.

1 The travel time is based on the time taken to drive between the two schools on a weekday morning.

2 With the additional condition that the baseline year needs to include at least 1,200 pupils (i.e. be in the established trust category). This is to avoid the situation where a trust is classified as rapidly expanding because it, for example, is a group of small primary schools joined by a large secondary.

1.2 How we examine pupil characteristics in multi-academy trusts

Data on the characteristics of pupils within each multi-academy trust is derived from the School Census and the Performance Tables. We examine:

- The proportion of pupils identified as having special educational needs
- The proportion of pupils for whom their first language is other, or believed to be other, than English
- The proportion of pupils eligible for the Pupil Premium
- The proportion of pupils with low prior attainment
- The proportion of pupils classified as mobile.[3]

1.3 How we assess the performance of multi-academy trusts

We consider the performance of multi-academy trusts across five dimensions

- **Current performance:**
  Whether pupil progress in reading, writing and mathematics at the end of Key Stage 2 and in Progress 8 at the end of Key Stage 4 in 2016 is significantly different from average. The overall attainment and progress of schools within each multi-academy trust is likely to reflect the types of schools that join that trust, i.e. if a trust tends to take over previously failing schools then it will take time for those schools to demonstrate improvement. The Department for Education's performance measures (on which these outcomes are based) weight school outcomes by the length of time they have been with the trust (so that those open the longest carry more weight) but this still does not fully control for the previous performance of those schools.
- **Improvement in outcomes:**
  Whether the value added of schools at the end of Key Stage 2 and Key Stage 4 has improved over time in comparison to schools with a similar starting point. These measures also give more weight to those schools open the longest within the trust.[4] They are a better summary of the impact that a trust is having on school performance but changes in accountability mean that they are only available to 2015. This has impacts in two ways. Firstly, that the measures are relatively old and secondly that it only covers those MATs that had a sufficient number of schools (five at Key Stage 2 and three at Key Stage 4) open at the start of the 2014/15 academic year.
- **Attainment of disadvantaged pupils:**
  Compares the attainment of pupils eligible for the Pupil Premium within the trust against Pupil Premium pupils nationally and all pupils nationally in 2016. As with the overall attainment and progress measure this does not control for the starting point of these schools.

3 A pupil is mobile if they joined the school during year 5 or year 6 at Key Stage 2 or during year 10 or year 11 at Key Stage 4.

4 This approach in official measures aims to avoid a perverse incentive whereby trusts do not to take on the most challenging schools. However, it does mean that the performance of trusts that have turned around school performance quickly is understated. On balance, we believe that introducing a weighting is fairest.

- **Ofsted category:**
  Whether any schools within the trust are currently rated as inadequate by Ofsted (special measures or serious weaknesses). This is an attempt to identify cases where some schools may be 'left behind'. Within this analysis we adopt Ofsted's approach of treating sponsored academies as new schools, therefore schools that were previously rated as inadequate prior to becoming a sponsored academy would only be included here if they had subsequently received that outcome as an academy. Whilst converter academies retain their inspection history relatively few schools rated as inadequate go down the converter route.[5]
- **Schools with relatively high expenditure:**
  Whether there at least two schools within the trust where expenditure is currently at least 10 per cent higher than income. This is an attempt to identify cases where the trust may not be financially sustainable. However, it can also indicate where there is cross-subsidisation across the MAT. We have therefore also carried out some analysis examining total income and expenditure across the MAT.

All of these measures have a limiting factor in that poorly performing trusts may have already had their schools removed (re-brokered) with the worst performing closed altogether. This will have artificially inflate the results of some trusts and potentially mask the impact of some factors (as the worst performing will not show up in the results). However, the number of schools being re-brokered and trusts being closed completely is a small number in comparison to the overall totals included in the analysis.[6]

5 There were 58 converter academies rated as inadequate at 31 December 2016. All of these had been inspected as an academy, 7 had also been rated as inadequate prior to conversion.

6 Around 100 academies were rebrokered in each of the last two years.

Part 2: Characteristics of multi-academy trusts

2.1 Multi-academy trusts by structural features

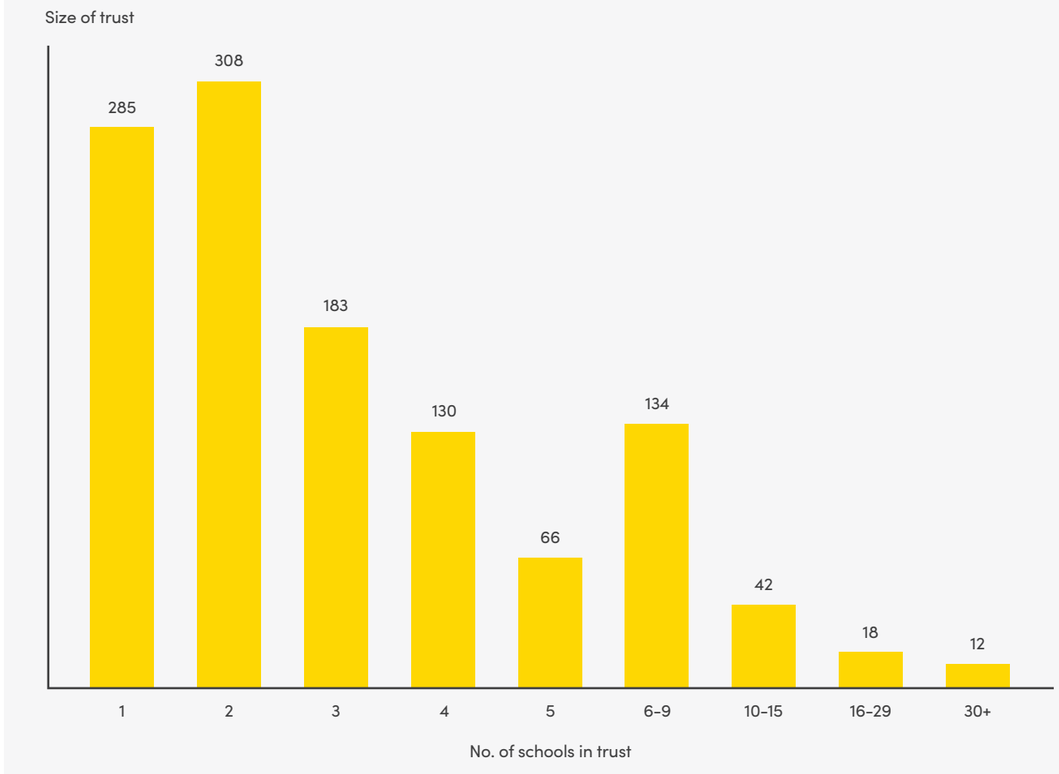
There are a total of 1,178 multi-academy trusts with open schools in Edubase as at January 2017. The majority of the analysis in this report covers trusts with at least four schools, giving a total of 402 multi-academy trusts. Figure 2.1.1 shows the structural features of these trusts and Figures 2.1.2 and 2.1.3 show interactions between characteristics. We find that:

- The vast majority of multi-academy trusts are small, defined as starter trusts (571 trusts in the full dataset and 66 in the reduced dataset) and established trusts (550 trusts in the full dataset and 283 in the reduced dataset). There are 40 national trusts and 13 system leader trusts.
- The majority of trusts either have a mix of academy types or are predominantly converter (182 and 165 trusts respectively) with just 38 trusts having predominantly sponsored academies.
- A mix of phases is the most prevalent type with 183 such trusts alongside 136 primary and 70 secondary trusts. There are 13 trusts consisting of predominantly special or alternative provision academies.
- Nearly three-quarters of trusts are tightly clustered with all schools in the trust being within one hour's travel time of all other schools in the trust. In 80 trusts every school has at least one other school within one hour's travel time. There are 20 trusts where there are schools 'isolated' from other schools in the trust (but less than one fifth of the total), and a further 12 where at least a fifth of schools in the trust are in this position.
- There are 188 trusts which have experienced at least one incidence of rapid growth within the past five years – meaning that pupil numbers increased by at least 20 per cent in one year.[7]
- A total of 98 trusts moved between size groups over the past five years – for example six schools moved from being national to being system leader trusts. There were 10 trusts that grew from new to national or system leader trusts within five years and one further trust that moved from being an established trust to being a system leader.
- Two-thirds of system leader trusts are predominantly comprised of sponsored academies, one third are mixed. Large system leader trusts are predominantly well established academy sponsors rather than chains of converter academies.
- Among national trusts, two-thirds are mixed and a fifth are predominantly converter academies. Sponsor dominated trusts are far less prevalent at this size and are even less common in smaller trusts where nearly half of starter and established trusts are predominantly converter based.

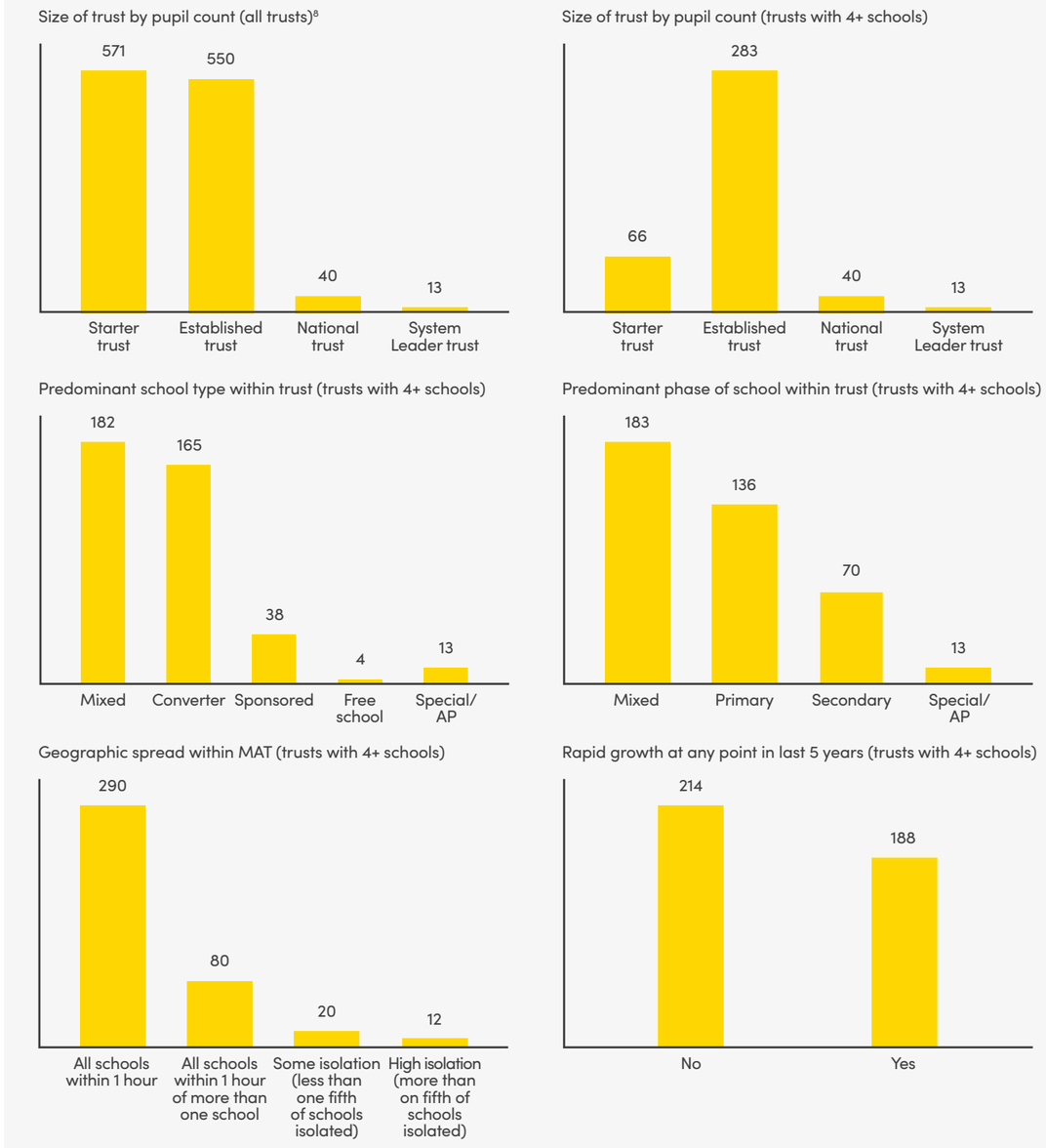
7 Around 100 academies were rebrokered in each of the last two years.

- The vast majority of smaller trusts follow tight geographical clusters. In four-fifths of starter and established trusts all schools are within one hour of all other schools. National and system leader trusts are far more likely to have schools experiencing some isolation. There are no system leader trusts in which every school is within an hour of every other school, though most have at least one school within reach. Four of the 13 system leader trusts have at least one school that is not within a reasonable travel time of any other school in the trust.
- There is some evidence of school isolation being addressed over time. Of those trusts with at least four schools in September 2012, 11 had at least one school in an isolated position at that point. By 2017, five of those trusts had expanded so that every school had at least one other school within one hour (Figure 2.14).

Figure 2.1.1: Structural features of multi-academy trusts within analysis



8 Note that there were four trusts for which pupil numbers were not available as they were new schools. Hence the total number of trusts here is 1,174. However, it would be reasonable to assume that these would be classified as starter trusts.



See appendix figure a for a Comparison of size of trust in 2011/12 and 2016/17

Figure 2.1.2: The relationship between size of multi-academy trust and prevalent type of academy within the trust

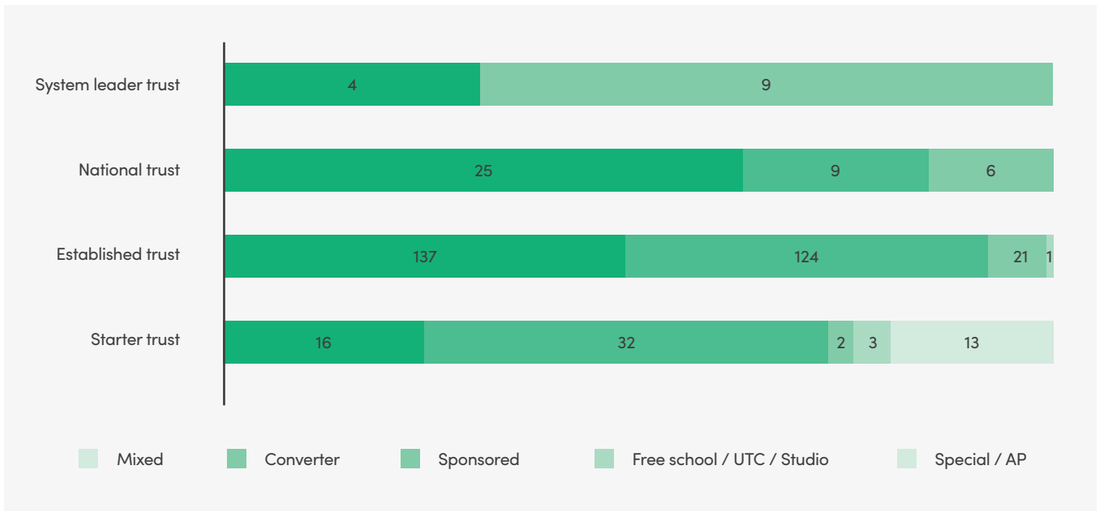
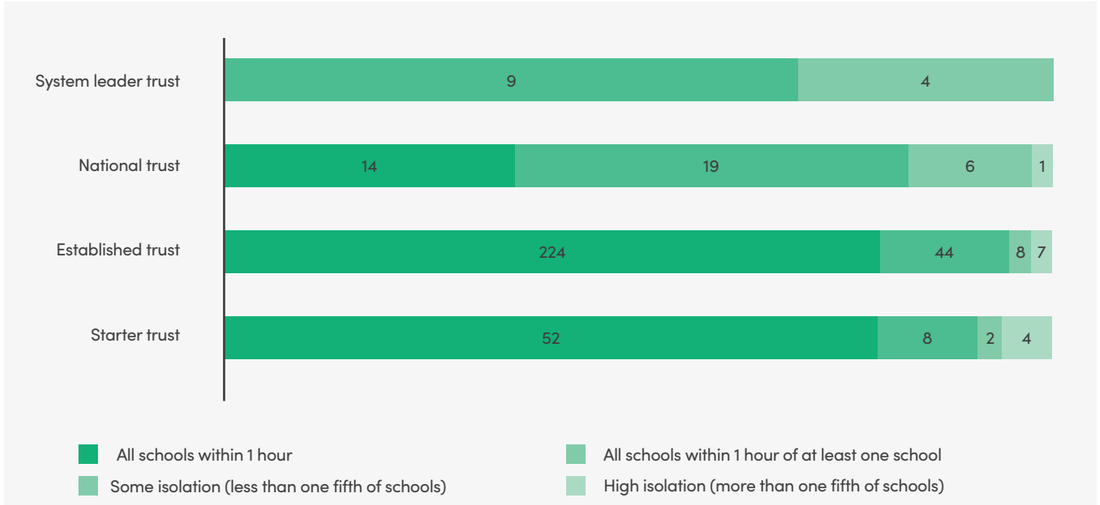


Figure 2.1.3: The relationship between different size of multi-academy trust and geographic spread



See appendix Figure 2.1.4 for change in geographic spread between 2012 and 2017

2.2 Multi-academy trusts by structural features and pupil characteristics

We now consider the characteristics of pupils who attend schools within multi-academy trusts split by these structural differences. This is important for several reasons. Firstly, when we consider school performance (and hence the outcomes of trusts) we should acknowledge the relationships that exist between pupil characteristics and outcomes. For example, we know that pupils from disadvantaged backgrounds tend to achieve lower results than their peers and that Ofsted outcomes are correlated with the level of disadvantage at school level.[9] While a particular MAT structure may appear more successful, it may simply reflect the types of pupils that are attending those schools.

Secondly, the profile of pupil characteristics within a school is likely to affect how staffing and resources are deployed (for example the balance between teachers and teaching assistants) at school level and potentially across a MAT. Therefore, the decisions that MATs are taking in terms of resource allocation may be attributable as much to the characteristics of their pupils as to the operation of the MATs.

Thirdly, the characteristics of pupils within a school are likely to be correlated with the level of funding available. This relationship is likely to be complex and varied across the country as each local authority operates its own funding formula. However, we know that schools with higher levels of disadvantage or with low prior attainment (for example) attract, on average, higher levels of funding.

We find that:

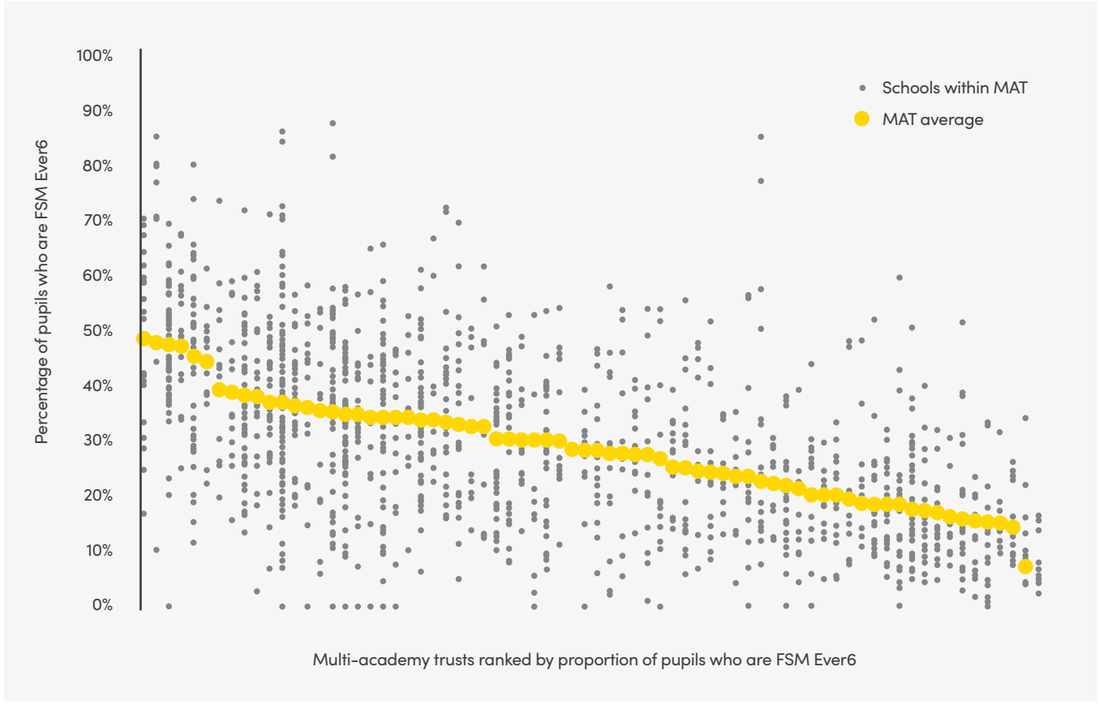
- **Size of trust:**
  Smaller trusts tend to have low numbers of pupils for whom English is an additional language and such pupils are far more prevalent in national and system leader trusts. Similarly, pupils eligible for the Pupil Premium or with low prior attainment are far more common amongst these larger trusts. The size of trust is less relevant when considering pupils with special educational needs or pupils classified as mobile. Although starter trusts appear to have a relatively high proportion of mobile pupils.
- **Mix of school types:**
  There are clear differences between trusts that are predominantly sponsored academies and those that are predominantly converter. The former have much higher numbers of EAL pupils, pupils eligible for the Pupil Premium or with low prior attainment than the latter.
- **Geographic spread:**
  Clustering and isolation of schools does not appear to be correlated with pupil characteristics. We find that trusts with some isolation (i.e. that have schools not within a reasonable travel time of another school) have slightly higher rates of EAL, Pupil Premium and low prior attainment but this may actually reflect the fact that these trusts tend to be larger trusts including system leaders.
- **Phase mix:**
  The phase mix of schools is not strongly correlated with pupil characteristics. EAL pupils are slightly more prevalent in trusts with a mix of primary and secondary schools but this may reflect the fact that these trusts tend to be larger.

9 Hutchinson, J. 'School inspection in England: is there room to improve?', Education Policy Institute, November 2016.

- **Growth:**
  Trusts that have expanded rapidly at some point over recent years tend to have slightly higher levels of EAL, low prior attainment and pupils eligible for the Pupil Premium. This may reflect growing trusts taking on more challenging schools.

The relationships we describe here relate to the average (median) MATs within each group. But Figures 2.2.2 to 2.2.6 illustrate the variation that exists within each of these groups. With some exceptions, the characteristics of any MAT relate to the individual circumstance of that trust rather than being linked closely to their structure. Furthermore, there is also variation within trusts, particularly at national and system leader trust level. To illustrate this, Figure 2.2.1 shows the FSM Ever6 (Pupil Premium) rates for larger MATs (those with at least 10 schools) and then also plots the FSM Ever6 rates for the schools within that MAT. Trusts with the highest levels of disadvantage (those in which nearly half of pupils eligible for the Pupil Premium), still have individual schools with rates well below average.

Figure 2.2.1 FSM Ever6 rate for the largest multi-academy trusts with rates for individual schools within the trust also plotted[10]



10 Nationally around 32 per cent of pupils at the end of Key Stage 2 and 28 per cent of pupils at the end of Key Stage 4 are 'disadvantaged'.

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Characteristics of multi-academy trusts

See appendix for:

Figure 2.2.2 for number of multi-academy trusts by proportion of pupils with special educational needs

Figure 2.2.3 for number of multi-academy trusts by proportion of pupils whose first language is other than English

Figure 2.2.4 for number of multi-academy trusts by proportion of pupils who are eligible for the Pupil Premium (Ever6)

Figure 2.2.5 for number of multi-academy trusts by proportion of pupils with low prior attainment

Figure 2.2.6 for number of multi-academy trusts by proportion of pupils who are 'mobile'

Figure 2.2.7: Summary of the relationship between MAT structure and pupil characteristics

Shading indicates factors where the relationship appears strong.

	Size of trust	Mix of schools within trust	Geography	Phase mix	Growth
Special educational needs (Figure 2.2.1)	No clear relationship between prevalence and size of trust.	Generally no link between type of academies in trust and prevalence of SEN. Low proportions in free schools / UTCs / studio schools but small number of MATs.	No clear relationship between prevalence and geographic spread of trust.	No clear relationship between prevalence and phase mix. Lower median in special / AP group but some very high numbers (reflecting the different types of schools in each group.)	No clear relationship between prevalence and rate of growth of the trust.
First language other than English (Figure 2.2.2)	Low in small trusts and much larger in large (national and system leader) trusts. But variation within each group.	Much more prevalent in trusts with that are predominantly sponsored academies. Over half of pupils in some cases.	Higher on average in trusts with some isolation (perhaps reflecting size and school mix.)	Slightly higher in trusts that are a mix of primary and secondary schools (perhaps reflecting size and school mix.)	Higher in trusts that have growth rapidly at some point in recent years.
Pupil premium (Figure 2.2.3)	Much higher in system leader trusts, though some smaller trusts also have very high rates.	On average, much higher in trusts that are predominantly sponsored, where the median is double the median for converter trusts.	Slightly higher (on average) in trusts with some isolation but wider variation within each group.	Very little difference between primary, secondary and mixed trusts but, much higher in special / AP trusts.	Slightly higher in trusts that have growth rapidly at some point in recent years.
Low prior attainment (Figure 2.2.4)	Much higher in system leader trusts, though some smaller trusts also have very high rates (this may include special trusts.)	On average, much higher in trusts that are predominantly sponsored, where the median is nearly double the median for converter trusts.	Slightly higher (on average) in trusts with some isolation but wider variation within each group.	Slightly higher in secondary trusts than primary (this may reflect the underlying measure of prior attainment.). Three times as high in special / AP trusts	Slightly higher in trusts that have growth rapidly at some point in recent years.
Mobile pupils (Figure 2.2.5)	More prevalent amongst starter trusts than other trusts, but many starter trusts so have low numbers.	No clear relationship between prevalence and types of schools within the trust.	No clear relationship between prevalence and geographic spread of trust.	Less prevalent in secondary MATs than in Primary.	No clear relationship between prevalence and rate of growth of the trust.

Part 3: Performance of multi-academy trusts

3.1 Performance against each performance measure

In this section we compare the performance of multi-academy trusts in each of the five dimensions.

Performance against these measures is broken down by the five descriptors of MAT structure (size of trust, mix of school types within the trust, geographic spread, phase mix and rate of growth in the trust).

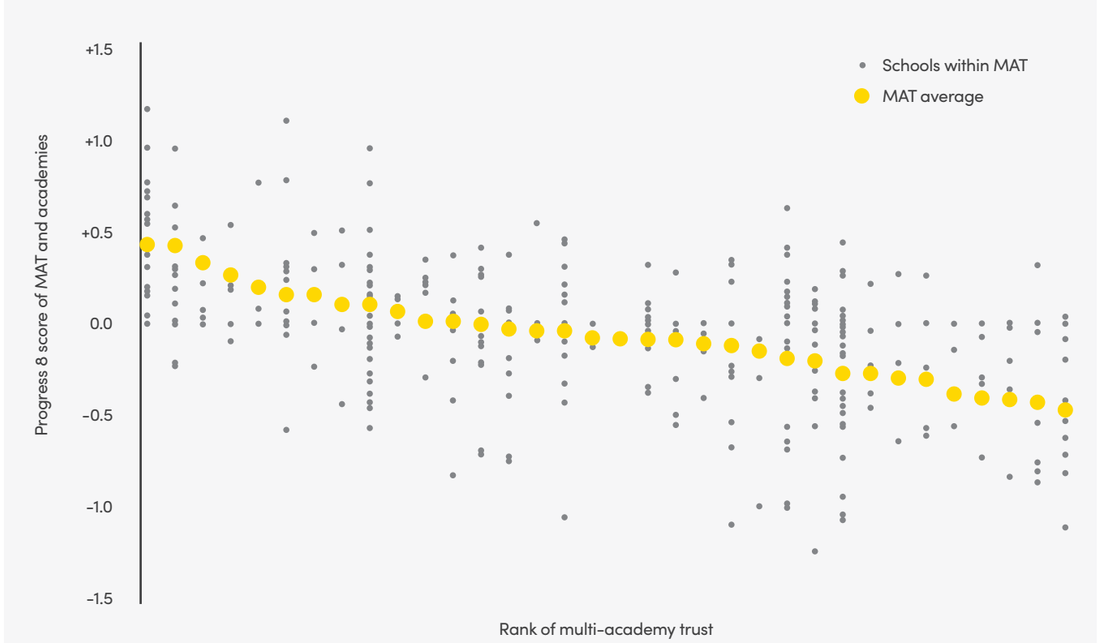
It is difficult to assign causality to these factors. The formalisation of the criteria used by Regional Schools Commissioners when assessing the capacity of MATs to expand is a relatively recent development[11] but it is probably reasonable to expect that earlier decisions were at least informed by similar considerations. For example, trusts may have become large system leaders because they had previously been successful or some schools may have been allowed to be geographically isolated as they were already high performing. Furthermore, these factors overlap (e.g. larger system leader trusts are more likely to have large numbers of sponsored academies).

There is also variation within multi-academy trusts. For example, in Figure 3.0 we plot the Progress 8 score for the trust as a whole and then for the individual schools within the trust.

11 House of Commons Education Committee, 'Multi-academy trusts', February 2017, p.27.

Figure 3.0: Average Progress 8 score of multi-academy trusts and the academies within them[12]

With these caveats, the analysis does indicate a number of patterns and these are set out in Figures 3.1 – 3.11.



12 Note that the vertical axis has been truncated to exclude schools with scores below -1.5. There were three schools that were excluded, one studio school and two special converters. Note that this analysis is restricted to trusts and academies with a Progress 8 scores. It therefore covers a smaller number of trusts and academies than when considering pupil characteristics (cf. Figure 2.2.1)

We find that:

- **Size of trust:**
  System leader trusts are more likely to be driving improvements at Key Stage 2 than other trusts, though there is little difference in outcomes at Key Stage 4. Smaller trusts are more likely to demonstrate high attainment for Pupil Premium pupils at Key Stage 2 though system leader trusts do better at Key Stage 4. Larger trusts are far more likely to have at least one school rated as inadequate (having been rated as inadequate since joining the trust) than other trusts and also very likely to have at least two schools with relatively high expenditure. However, when considering overall income and expenditure across the MAT as a whole, relatively high expenditure was seen more frequently in established and national trusts. This may suggest that system leader trusts are sometimes using funding from one or more academies to cross subsidise other academies in the trust.
- **Mix of school types:**
  The picture on outcomes at Key Stage 2 is mixed, with sponsor trusts demonstrating good progress in writing whereas converter trusts are more likely to be below average; however there is little difference in Key Stage 2 reading or in Progress 8. Predominantly sponsored trusts are more likely to have demonstrated significant improvements at the end of primary school than converter trusts. Predominantly sponsored trusts are more likely than other trusts to have schools that are rated as inadequate (possibly reflecting historic and continuing performance issues).
- **Geographic spread:**
  There are few clear relationships between geographic spread within multi-academy trusts and outcomes. We find that at Key Stage 2, trusts with some isolation are slightly more likely to be above average in terms of improvement in outcomes whereas at Key Stage 4 they are slightly more likely to be below average. We find that tightly clustered trusts are less likely to have schools rated as inadequate than other trusts – these trusts tend to have more converter academies that would be more likely to have higher outcomes prior to conversion.
- **Phase mix:**
  There are few clear relationships between the phase mix within a trust and outcomes. Mixed phase trusts are more likely to be significantly above average for improvement at Key Stage 2 than significantly below. This is not the case at Key Stage 4 where such trusts are equally likely to be above or below. Trusts that are predominantly secondary are actually more likely to be below than above.
- **Growth:**
  The picture at Key Stage 2 is mixed where trusts that have expanded rapidly are slightly more likely to be above average than other trusts in writing, less likely in reading and equally likely in mathematics. They are more likely to have shown good improvement overall at Key Stage 2 (no difference at Key Stage 4) but more likely to have schools rated as inadequate or with relatively high expenditure.

3.2 Performance against multiple measures

In this section we consider the extent to which performance on one measure relates to another. In order to do this we define 'high-performance' in each of the five domains. High performance is:

- **Current performance:** Performance is significantly above average in two of reading, writing and mathematics at Key Stage 2 or is significantly above average on Progress 8 at Key Stage 4.
- **Improvement:** Performance is significantly above average in either improvement in Key Stage 2 reading, writing and mathematics at Key Stage 2 or Best-8 value added at Key Stage 4.
- **Attainment of disadvantaged pupils:** Performance of pupils eligible for the Pupil Premium is above the national average of all pupils in reading, writing and mathematics at Key Stage 2 or Progress 8 at Key Stage 4.
- **Ofsted category:** The trust has no schools in Ofsted category 4 (serious weaknesses or special measures).
- **High expenditure:** The trust has no, or only one school, where expenditure exceeds 110 per cent of income. We also carried out further analysis examining income and expenditure across the MAT as a whole.[13]
- Because of the limited coverage of the current performance measures and the improvement measures there are relatively few trusts that have valid outcomes against all of these measures. There are a total of 49 trusts (11 system leader trusts, 13 national trusts, 23 established trusts and 2 starter trusts) with outcomes in all five domains.

Of the 402 trusts with at least four schools, we find that:

- No trust was identified as high performing across all five domains
- 69 trusts were high performing in three domains.
- Only 14 trusts were identified as not being high performing in any domain
- When considering pupil outcomes there are four trusts that demonstrated high performance in current performance, improvement and performance of disadvantaged pupils. These are Outwood Grange, Harris Federation, ARK Schools and the Diocese of Westminster Academy Trust.
- A further nine trusts demonstrated high performance in two of these three domains. They are The Kemnal Academies Trust, The First Federation, Oasis, AET, The Priory Federation of Academies, St Barnabas Catholic Academy Trust, South Nottingham Academy Trust, Aspirations Academies Trust and Inspiration Trust.

13 We identified 42 trusts were expenditure was more than 110 per cent of grant funding (restricted to trusts with at least four schools and where at least two schools had income and expenditure data). This compares with 65 trusts meeting the first high expenditure definition. There were 26 trusts with high expenditure on both definitions.

Characteristics and Performance of Multi-Academy Trusts
Performance of multi-academy trusts

3.3 Propensity to be high performing by structural characteristics

The final analysis in this section examines whether it is possible to isolate the effect of individual trust characteristics on performance. In order to do this we carried out basic logistic regressions of the high performance outcomes against size (whether the trust is large – i.e. is a national or system leader trust), geographic spread (the trust not being within a tight cluster with all schools within one hour of each other), if the trust is predominantly converter, if the trust is predominantly sponsored, if the trust has a mix of phases and whether the trust has grown rapidly.

All of the models were relatively weak at predicting the outcome measure (r-squared values reaching 33 per cent for improvement and Ofsted outcomes but lower elsewhere). We find that:

- No factors were significant in predicting high performance in the current performance measure covering all pupils.
- Size of trust was significantly positive in relation to improvement in outcomes. The direction of causality is difficult here; it may be because high performing trusts have been allowed to expand.
- For the performance of Pupil Premium pupils the size of trust was negatively associated with high performance.
- Trusts were significantly less likely to have no schools in Ofsted category if they were large, sponsored or had grown rapidly. The relationship between sponsored academies and Ofsted category may reflect those trusts taking on more challenging schools.
- System leader trusts were far more likely than other trusts to have at least two schools where expenditure was at least 110 per cent of income.

See appendix for:

Figure 3.1 for performance against Key Stage 2 reading progress measure 2016

Figure 3.2 for performance against Key Stage 2 writing progress measure 2016

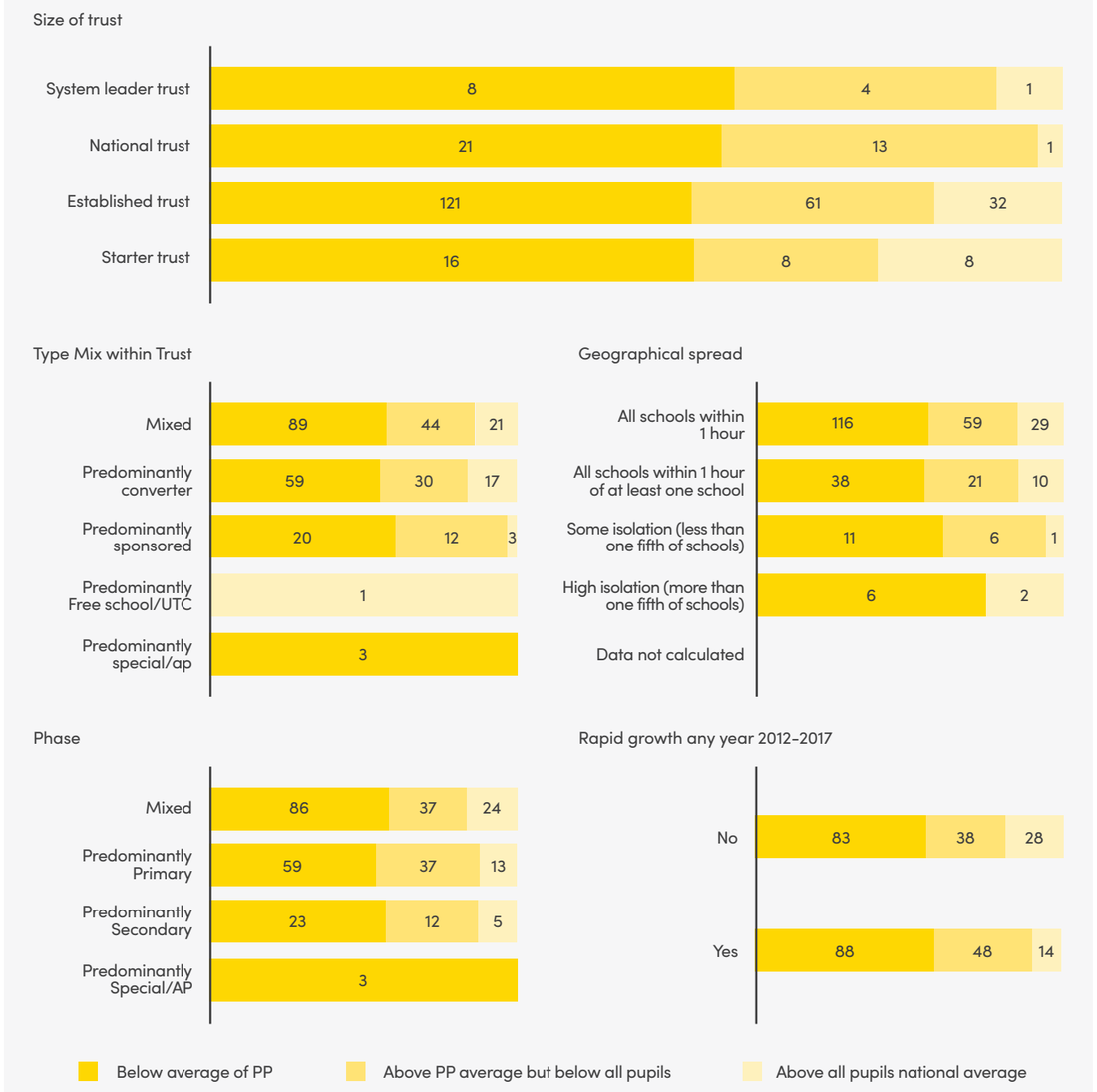
Figure 3.3 for performance against Key Stage 2 mathematics progress measure 2016

Figure 3.4 for performance against Key Stage 4 Progress 8 measure 2016

Figure 3.5 for improvement in Key Stage 2 reading, writing and mathematics value added measure 2015

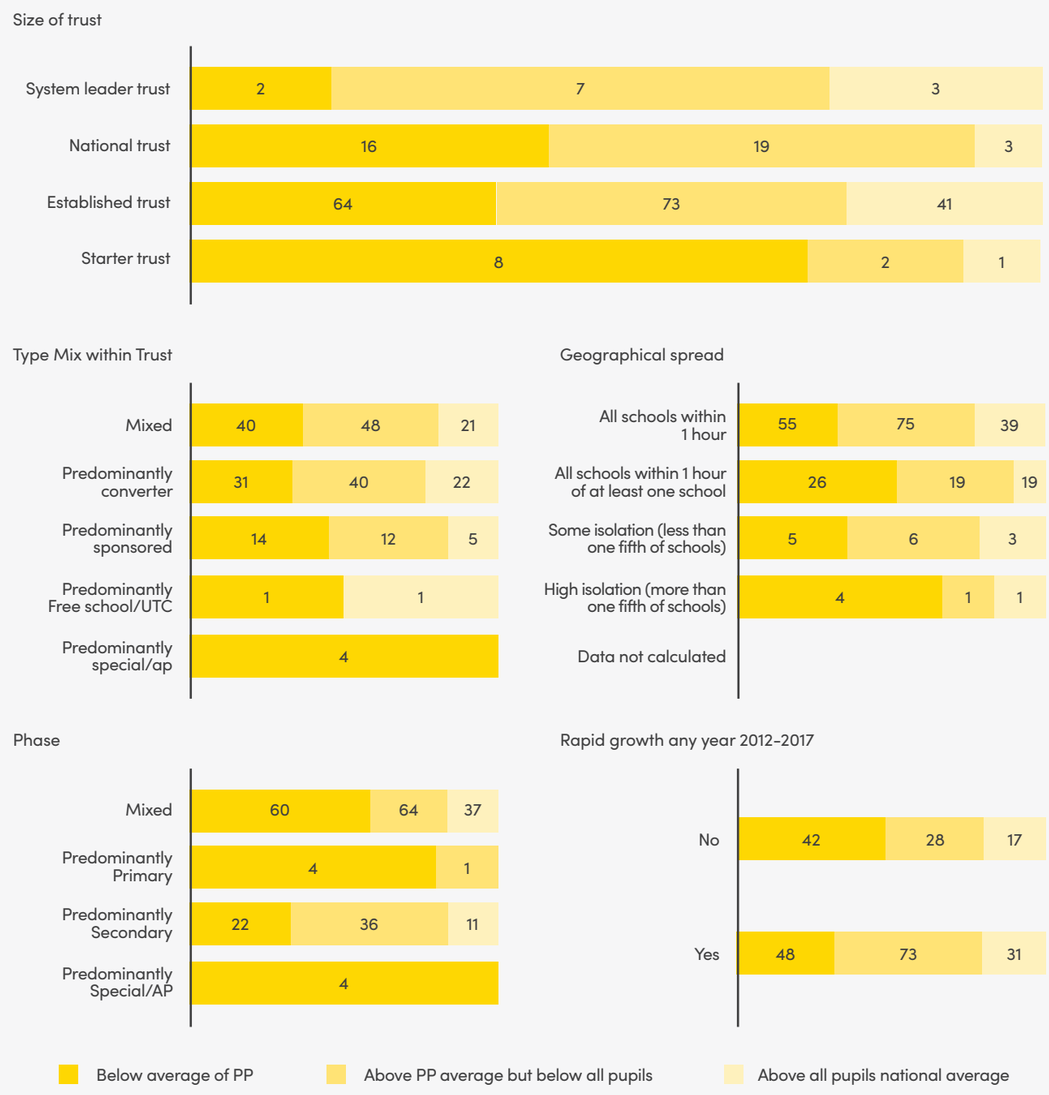
Figure 3.6 for improvement in Key Stage 4 best-8 value added measure 2015

Figure 3.7: Number of MATs by the proportion of pupils eligible for the Pupil Premium achieving the expected standard in reading, writing and mathematics 2016



See appendix Figure 3.9 for number of MATs by whether the trust has any schools in Ofsted category (inadequate or serious weaknesses)

Figure 3.8: Number of MATs by the Progress 8 scores of pupils eligible for the Pupil Premium 2016



See appendix Figure 3.10 for number of MATs by whether the trust has at least two schools where expenditure is >=110% of income

Figure 3.11: Summary table of the relationship between MAT structure and attainment, improvement, attainment gaps, school underperformance and financial position

Shading indicates factors where the relationship appears strong though not necessarily statistically significant.

	Size of trust [16]	Mix of schools within trust	Geography	Phase mix	Growth
Current performance (Figures 3.1.1-4)	Little difference in Key Stage 2 reading. System leader trusts performed better in writing, with a mixed picture in mathematics. National trusts were far more likely to be below average at Key Stage 4 than above whereas system leader trusts were equally likely.	Little difference in Key Stage 2 reading. Sponsored more likely to be above average in writing than below average (reverse true for converters). Insufficient data to draw any meaningful conclusions about converter trust at Key Stage 4 and no difference between sponsored and mixed trusts.	No clear relationship between reading, writing and maths progress or Progress 8 and geographic spread.	No clear relationship between reading, writing and maths progress or Progress 8 and phase mix.	The picture at Key Stage 2 is mixed where trusts that have expanded rapidly are slightly more likely to be above average than other trusts in writing, less likely in reading and equally likely in mathematics. but more likely to have schools in Ofsted category or with relatively high expenditure.
Improvement in outcomes (Figures 3.2.1-2)	System leader trusts more likely to be high performing at Key Stage 2 than other trusts (6 out of 11 significantly above average). There is little difference between trust types at Key Stage 4.	No converter trusts at Key Stage 2 significantly above average but around a third of sponsored trusts are. Cannot draw conclusions on converter performance at Key Stage 4 as numbers too small.	At Key Stage 2 trusts with some isolation are actually slightly more likely to be significantly above average than others. At Key Stage 4 trusts with some isolation are more likely to be below average than trusts that are clustered.	At Key Stage 2, trusts with a mixed phase are more likely to be significantly above average than below (though relatively small number in either), in primary trusts they are equally likely. At Key Stage 4 mixed phase trusts are equally likely to be above / below average whereas secondary trusts more likely to be below.	Trusts that have expanded rapidly are more likely to have shown good improvement overall at Key Stage 2 (no difference at Key Stage 4)
Attainment of disadvantaged pupils (Figures 3.3.1-2)	Smaller trusts more likely to have attainment for Pupil Premium pupils that is above national average than other trust types at Key Stage 2. System leader trusts do better at Key Stage 4.	Trusts that are predominantly converter more likely than predominantly sponsored to have high attainment for Pupil Premium pupils.	Trusts with some isolation less likely to have high performance for PP at Key Stage 2 but numbers are small. No clear relationship at Key Stage 4.	No clear relationship between phase mix and attainment of Pupil Premium pupils.	No clear relationship between growth and attainment of Pupil Premium pupils.
Ofsted inadequate (Figures 3.4.1)	Larger trusts are far more likely to have at least one school rated as inadequate.	Trusts that are predominantly sponsored more likely than other trusts to have schools rated as inadequate.	Tightly clustered trusts less likely to have schools in rated as inadequate than trusts with a wider spread.	Trusts that are predominantly secondary slightly more likely to have schools rated as inadequate.	Trusts that have expanded rapidly are more likely to have schools in Ofsted rated as inadequate.
Schools with relatively high expenditure (Figure 3.5.1)	Most system leader trusts have at least two schools where expenditure is 110% of income. Far less prevalent in smaller trusts. However, relatively high expenditure across the MAT was seen most frequently in the group of established and national trusts (i.e. medium sized)	Trusts that are predominantly sponsored academies have higher likelihood of at least two schools with relatively high expenditure.	Prevalence increases with geographical spread (though only one trust with high isolation is affected).	No clear relationship though slightly less prevalent in predominantly primary trusts	Trusts that have expanded rapidly are more likely to have schools with relatively high expenditure.

14 Larger trusts are more likely to be significantly different from average as the underlying number of pupils in the calculation is, by definition, larger. Therefore the comparison here is concerned more with the balance between significantly above/below rather than the numbers within each category.

Part 4: Identifying groups of multi-academy trusts with similar characteristics

In Part 2 we examined both the structural characteristics of multi-academy trusts and the characteristics of pupils who attend them and the relationship between them. In this section we attempt to group trusts into clusters with similar characteristics and identify high and low performing MATs within each group.

Methodology

Groups of MATs are identified through a cluster analysis[15]. The groups are identified using a range of factors:

- Percentage of pupils whose first language was other than English
- Percentage of pupils who have an identified special educational need
- Percentage of pupils recorded as Ever6
- Percentage of pupils with low prior attainment
- Percentage of pupils who are mobile
- Number of pupils in the trust
- Whether the trust is tightly clustered (all schools within 1 hour of all other schools.)

We saw in Part 2 that characteristics such as the proportion of sponsored versus converter academies were closely related to these characteristics and so we might expect the cluster analysis to separate out these features.

Results

We identified five clusters of multi-academy trusts. Figure 4.1 plots the average (mean) rate of each characteristic within each cluster, Figure 4.2 shows how many of each academy type are within each cluster, Figure 4.3 shows the size of MATs within each cluster and finally Figure 4.4 shows the geographic spread of MATs within the cluster.

We then examined how these clusters perform against the measures used in Part 3. (Figure 4.4 – Figure 4.8).

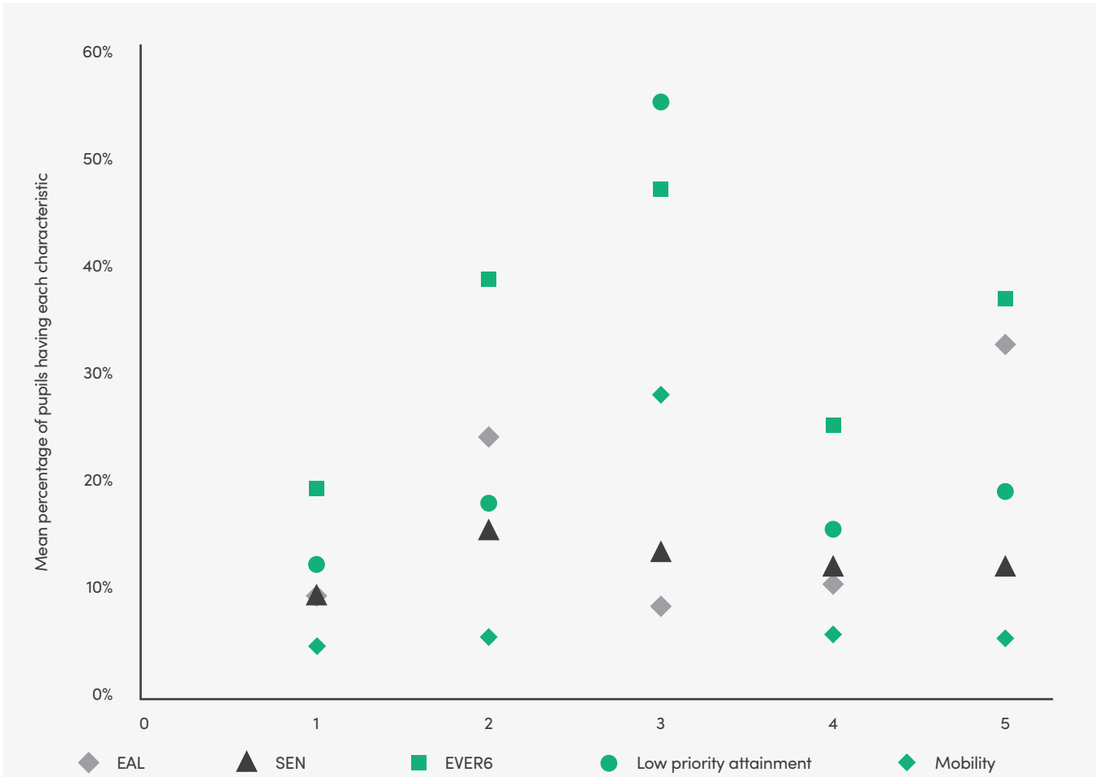
There is variation within each cluster in terms of both characteristics and performance. Not all MATs will reflect these descriptions but broadly speaking:

- **Cluster 1:**
  Small and medium sized MATs in tight geographical clusters and dominated by converter academies. These trusts have lower levels of disadvantage, EAL, low prior attainment, and SEN than other trusts. There is no clear pattern to their performance though they are more likely to demonstrate high performance on current performance than improvement. They are unlikely to have schools rated as inadequate or with high expenditure.

15 in this case a two-step cluster algorithm in SPSS.

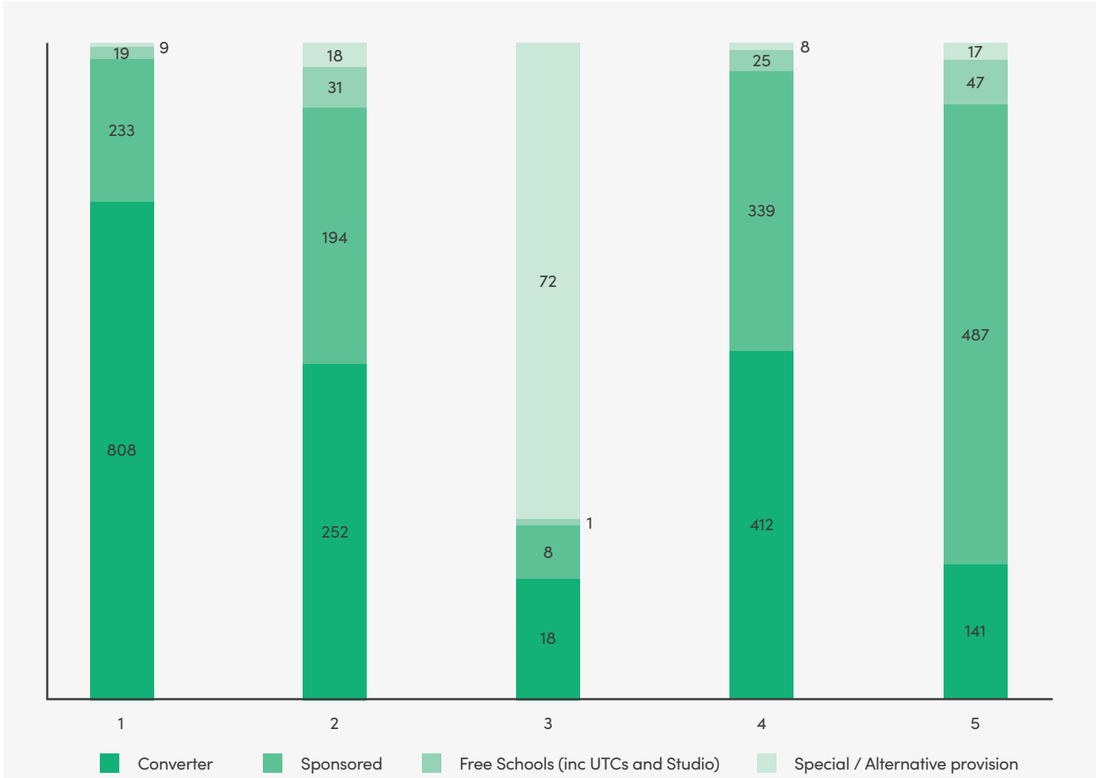
- **Cluster 2:**
  Small and medium sized MATs in tight geographical clusters with a balance of sponsored and converter academies with some free schools and special/ AP schools. These trusts have relatively high levels of disadvantage and EAL. The number of trusts with performance results is small but within that a relatively high number of underperformers on both current performance and improvement.
- **Cluster 3:**
  Small trusts, with large numbers of special and alternative provision schools. Many are in tight geographical clusters but a significant proportion show greater spread. Reflecting some of the schools included these trusts tend to have high levels of pupil mobility and low prior attainment. Insufficient data to draw any conclusions around their performance in terms of Performance Tables outcomes but most do not have any inadequate schools or schools with high expenditure.
- **Cluster 4:**
  Medium and larger trusts generally not in tight geographical clusters with a with a balance of sponsored and converter academies with some free schools and special /AP schools too. Levels of EAL are low and disadvantage broadly average. In terms of performance there are a mix of trusts (some significantly below, some above) when considering current performance but a tendency to be lower performing on improvement measures. A relatively large number of trusts have schools rated as inadequate and schools with high expenditure.
- **Cluster 5:**
  Medium and larger trusts (including system leader trusts) generally not in tight geographical clusters and dominated by sponsored academies. These trusts tend to have high levels of disadvantage and EAL. These trusts show a mix of results on measures of current performance – disproportionately high numbers below average in Key Stage 2 reading and Progress 8, with better performance in Key Stage 2 writing and mathematics – with a more balanced picture on improvement measures. These trusts do well for Pupil Premium Pupils at Key Stage 4. Over half have at least one school rated as inadequate and around half have schools with high expenditure.

Figure 4.1: Pupil characteristics (mean percentage of pupils having each characteristic) in each cluster of multi-academy trusts[16]



16 Note that this is the mean of trusts within the group and is not weighted by school or pupil numbers.

Figure 4.2: Number of academies by type within each cluster



See appendix for:

Figure 4.3 for number of trusts by size and mean number of pupils by MAT within each cluster
Figure 4.3 for number of trusts by geographic dispersion within each MAT
Figure 4.4 for current performance measures by MAT cluster
Figure 4.5 for improvement measures by MAT cluster
Figure 4.6 for performance of Pupil Premium pupils by MAT cluster
Figure 4.7 doe number of trusts with schools rated as inadequate by MAT cluster
Figure 4.8 for number of trusts with schools with high expenditure by MAT cluster

Annex 1: Data sources and linking

The analysis was derived from a school level dataset constructed from a range of data sources.

List of schools included

The base file was an Edubase extract taken in January 2017 and covers all schools that were open (or open but proposed to close) at that point and recorded as being part of a multi-academy trust. This gives a total of 4,628 schools in 1,178 multi-academy trusts. Note that many multi-academy trusts consist of only one school but open as a MAT so that other schools might join at a later date.

Edubase provides a wide range of information about the school including its date of opening, its phase and its location. Groups of schools are identified using the multi-academy trust field. In some instances there were a number of multi-academy trusts within a higher level structure (an academy sponsor or an umbrella trust). In these instances, the trust is taken as the school group.

Pupil characteristics

Information on the number of pupils for whom their first language is other than English, have special educational needs or are eligible for free school meals are taken from the January 2016 School Census. Data on eligibility for the Pupil Premium and pupil mobility is derived from the School Performance Tables 2016 and matched to the school list using the school's Unique Reference Number (URN).

Schools that have recently opened as academies will be reported under a different URN in Edubase to the Census or Performance Tables. For these schools the predecessor school was identified and that school's characteristics data was used. Where schools had multiple predecessors the characteristics data was combined together.

School attainment

Data from the primary and secondary school Performance Tables 2016 was matched to the school list using the URN. For the purposes of Performance Tables the Department for Education takes school status as at the start of the academic year (so in this case September 2015). Any school that changed type – primarily schools becoming academies – after this date will have a different URN on the Performance Tables from the Edubase extract. In these instances it was decided NOT to match on using predecessor schools since this would be to attribute performance to the academy or multi-academy trust incorrectly. However, this does mean that schools that were already academies at September 2015 but not part of a multi-academy trust will have their results attributed to any trust they subsequently joined[17].

17 In other words, if a school joined a MAT in January 2016, its exam results for summer 2016 will be attributed to the MAT.

Characteristics and Performance of Multi-Academy Trusts
Data sources and linking

MAT / Academy level performance

Data from the Department for Education's 'Multi-academy trust performance measures: 2015 to 2016'[18] and the Education Policy Institute's 'School performance in multi-academy trusts and local authorities'[19] were matched using the multi-academy trust name. It was possible to match around two-thirds of trusts in this way but names are frequently inconsistent between different data sources. The vast majority of trusts could be matched once small variations in names had been corrected (e.g. the use of 'The' at the start of names) or identifying where trusts had recently changed their name or where the sponsor had a different name (but the set of schools was the same). In a small number of cases it was not possible to make a direct link between the trust as recorded on Edubase and as such the results are excluded from the analysis.

Measuring geographic spread

There are two ways to consider the spread of schools within a multi-academy trust. The first is to consider the travel distance between schools; the second is to consider the travel time. For this analysis we have considered the latter as we believe it enables a fairer comparison between rural and urban areas.

We identified every pair of schools within each MAT. A MAT with n schools has a total of n*(n-1)/2 combinations of schools within it. For example, a MAT with four schools A, B, C, D has six pairs of schools (AB, AC, AD, BC, BD, CD). We then calculated the driving time between each pair of schools using the R package 'gmapsdistance' which uses Google Maps functionality. The travel time was taken as at a weekday morning.

In the vast majority of cases the location was based on the full postcode recorded in Edubase. Where the function failed to return a valid travel route this was changed to the postcode sector (e.g SW1P 3) and then to the town. The latter was only required for one pair of schools.

A reasonable travel time was taken to mean as being within one hour. Trusts were then categorized on the basis of having all schools within reach of all other schools, all schools within reach of at least one other school, some schools isolated (less than one-fifth), many schools isolated (more than one fifth).

Financial data

Academy income and expenditure data was drawn from 'Benchmarking Return (Accounts Return) for year ending 31st August 2015'. Income was taken as grant funding per pupil and excludes any self-generated income. Expenditure is taken as total expenditure per pupil.

18 https://www.gov.uk/government/statistics/multi-academy-trust-performance-measures-2015-to-2016
19 https://epi.org.uk/report/school-performance-multi-academy-trusts-local-authorities/

Appendix

Appendix figure a

Comparison of size of trust in 2011/12 and 2016/17 – number of trusts by start point and end point

Size group 2011/12	Size group 2016/17: No pupils	Starter trust	Established trust	National trust	System leader trust
No pupils	0	51	135	9	1
Starter trust	0	15	63	5	0
Established trust	0	0	85	23	1
National trust	0	0	0	3	6
System leader trust	0	0	0	0	5
Total	0	66	283	40	13

Appendix Figure 2.1.4: Change in geographic spread between 2012 and 2017

Geographic spread - 2012	Geographic spread - 2017: All schools within 1 hour	All schools within 1 hour of at least one school	Some isolation less than one fifth of schools)	High isolation (more than one fifth of schools)	Total
Not in 2012 analysis (fewer than 4 schools in 2012)	263	52	15	11	341
All schools within 1 hour	27	9	0	0	36
All schools within 1 hour of at least one school	0	14	0	0	14
Some isolation (less than one fifth of schools)	0	4	3	0	7
High isolation (More than one fifth of schools)	0	1	2	1	4
Total	290	80	20	12	402

Figure 2.2.2: Number of multi-academy trusts by proportion of pupils with special educational needs

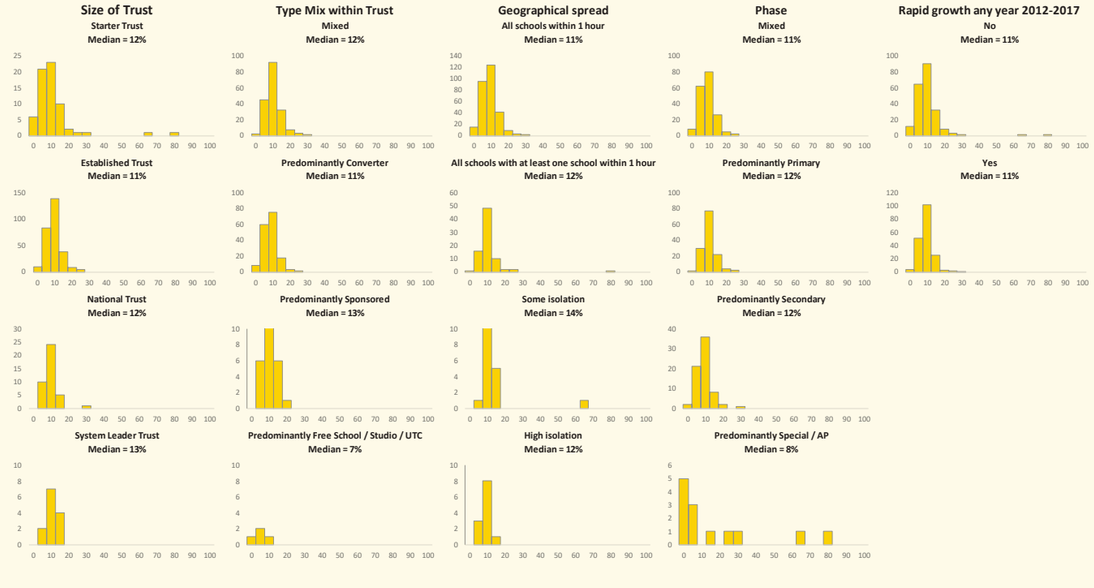


Figure 2.2.3: Number of multi-academy trusts by proportion of pupils whose first language is other than English

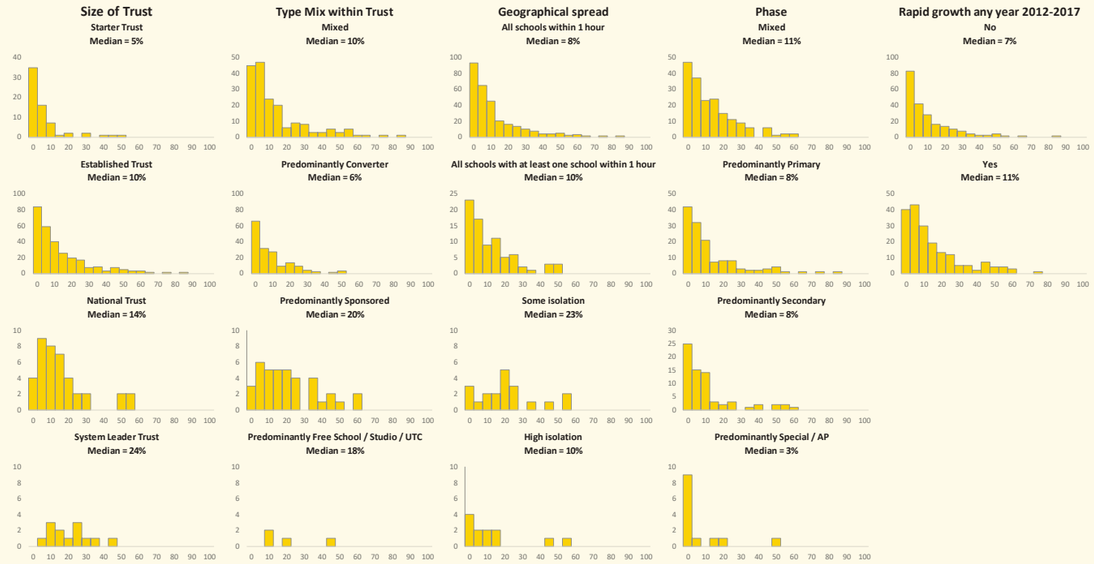


Figure 2.2.4: Number of multi-academy trusts by proportion of pupils who are eligible for the Pupil Premium (Ever6)

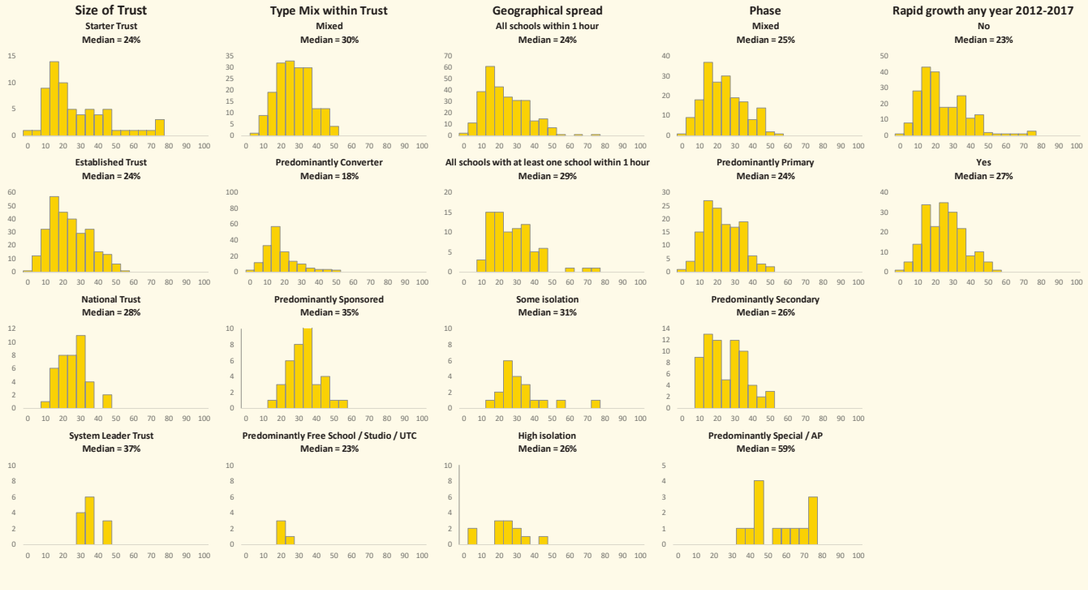


Figure 2.2.5: Number of multi-academy trusts by proportion of pupils with low prior attainment

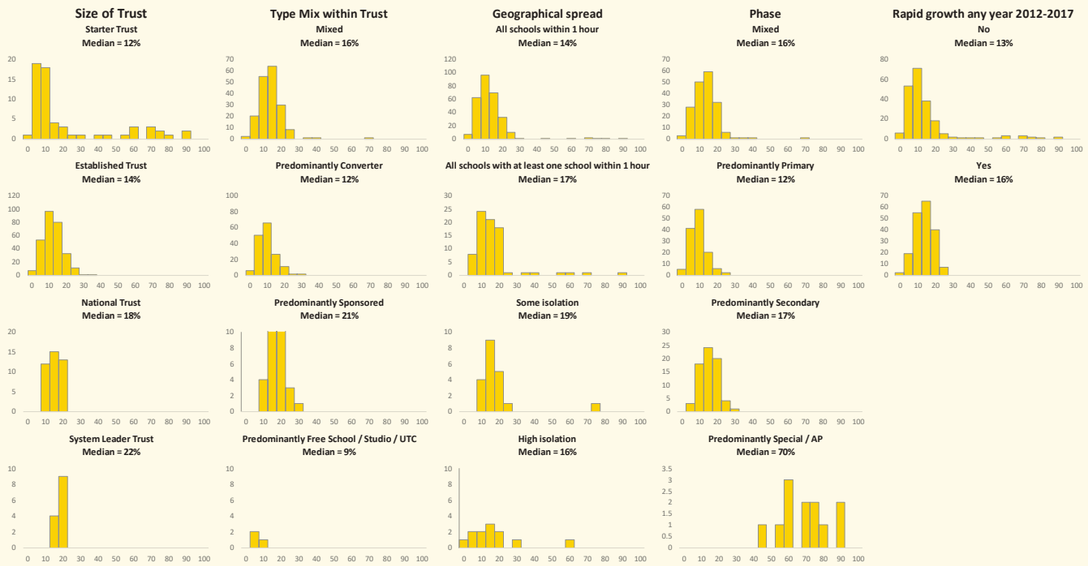


Figure 2.2.6: Number of multi-academy trusts by proportion of pupils who are 'mobile'

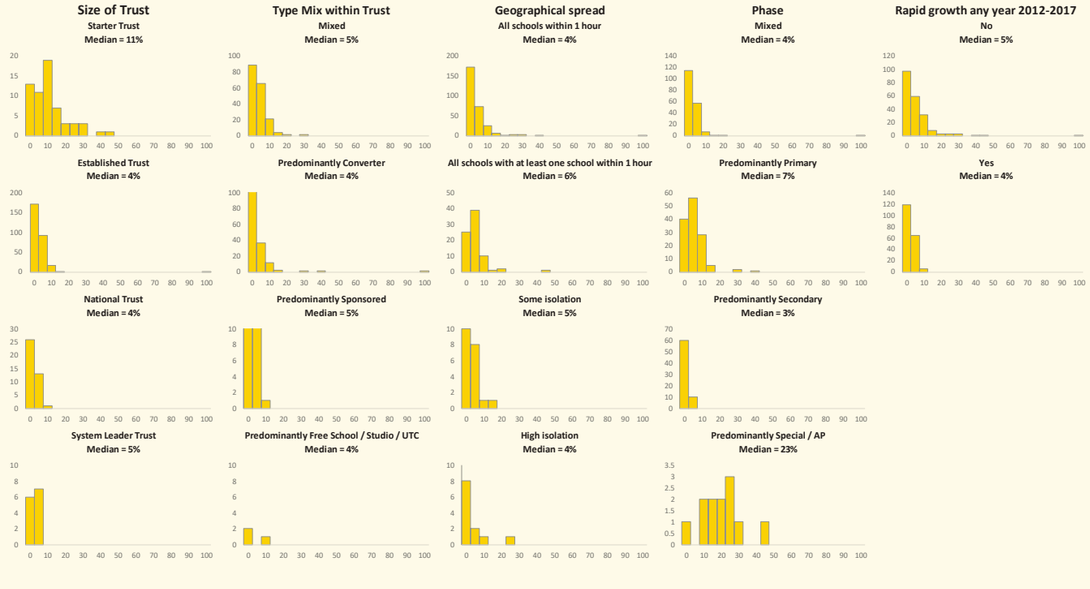


Figure 3.1: Performance against Key Stage 2 reading progress measure 2016

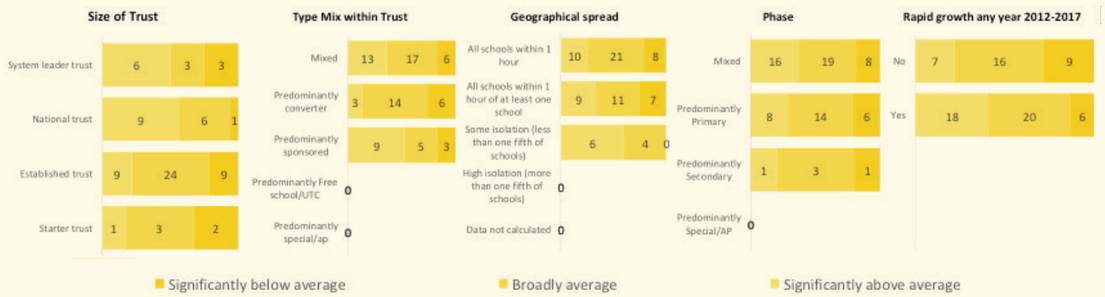


Figure 3.2: Performance against Key Stage two writing progress measure 2016

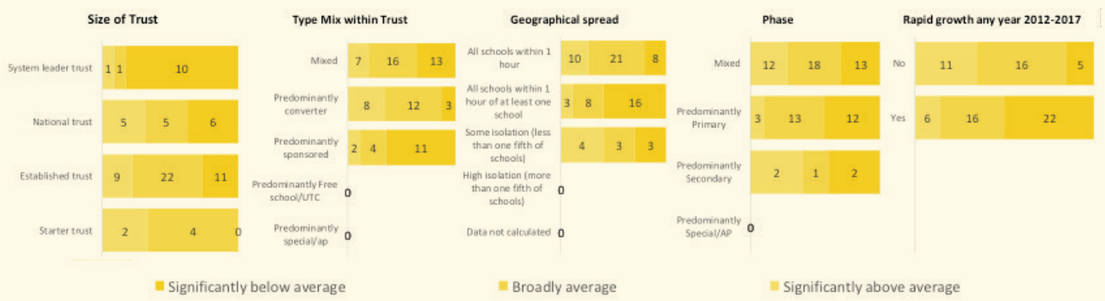


Figure 3.3 Performance against Key stage 2 mathematics progress measure 2016

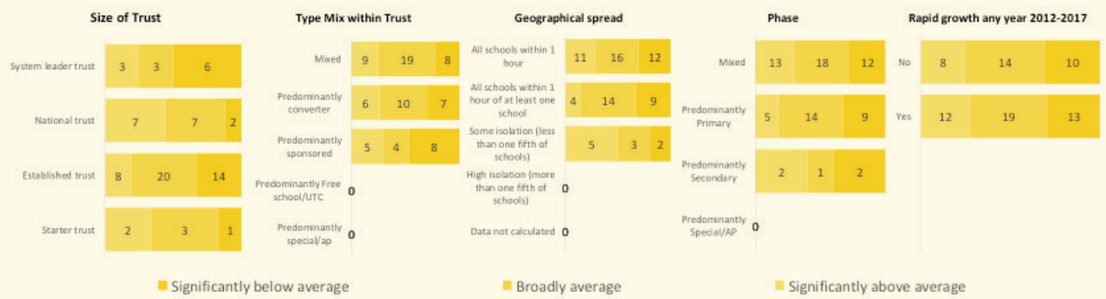


Figure 3.4: Performance against Key Stage 4 Progress 8 measure 2016

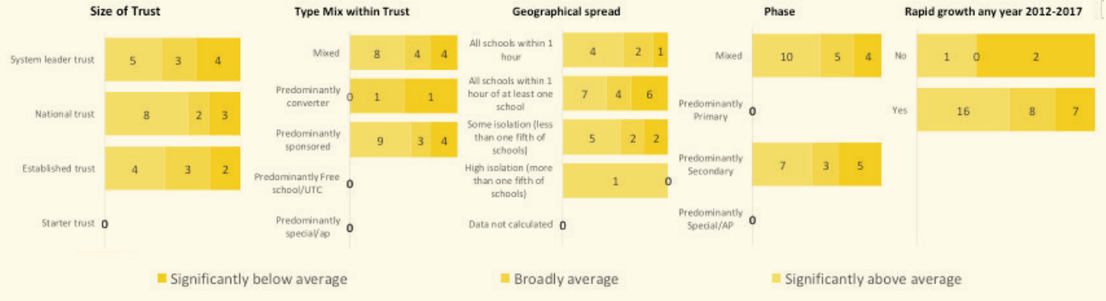


Figure 3.5: Improvement in Key Stage 2 reading, writing and mathematics value added measure 2015

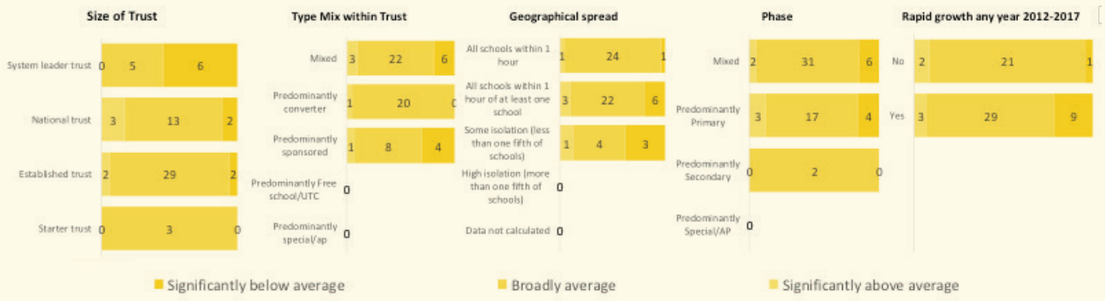


Figure 3.6: Improvement in Key Stage 4 best-8 value added measure 2015

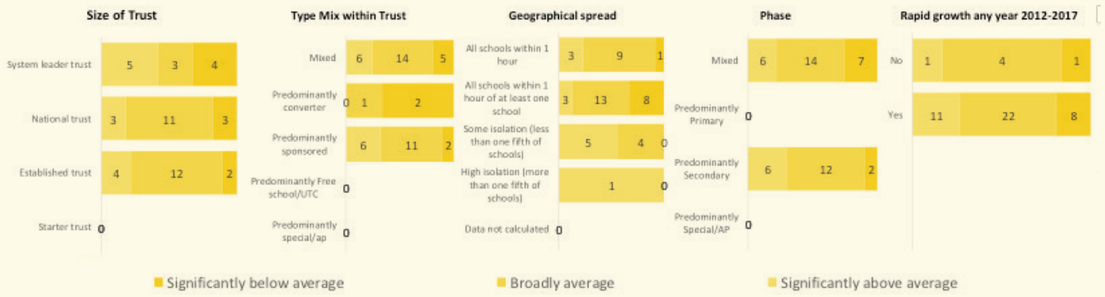


Figure 3.9 Number of MATs by whether the trust has any schools in Ofsted category (inadequate or serious weaknesses)

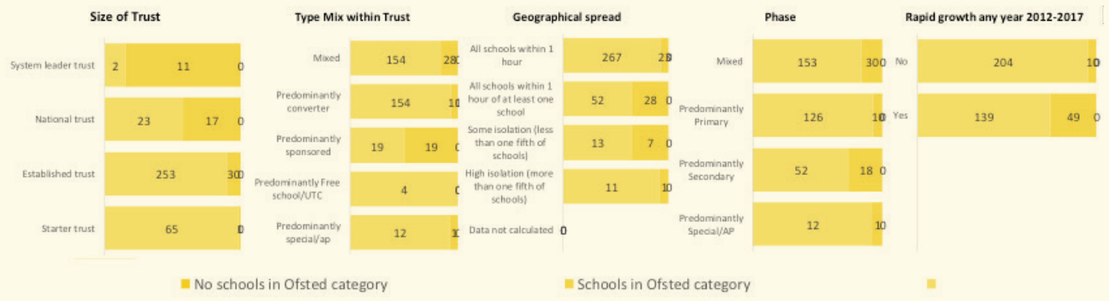


Figure 3.10: Number of MATs by whether the trust has at least two schools where expenditure is >=110% of income

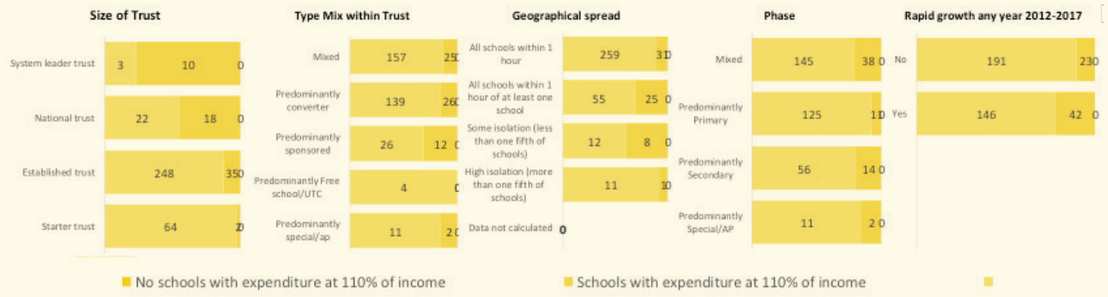


Figure 4.3: Number of trusts by size and mean number of pupils by MAT within each cluster

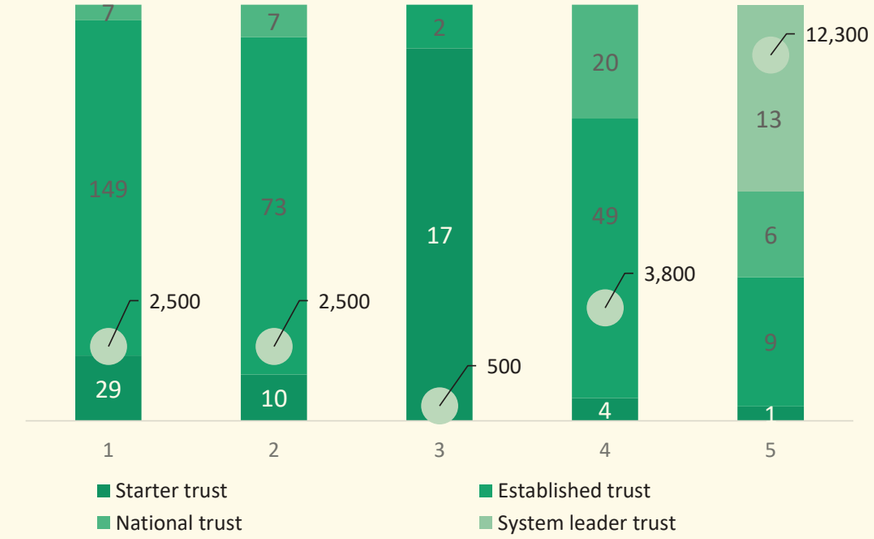


Figure 4.3: Number of trusts by geographic dispersion within each MAT

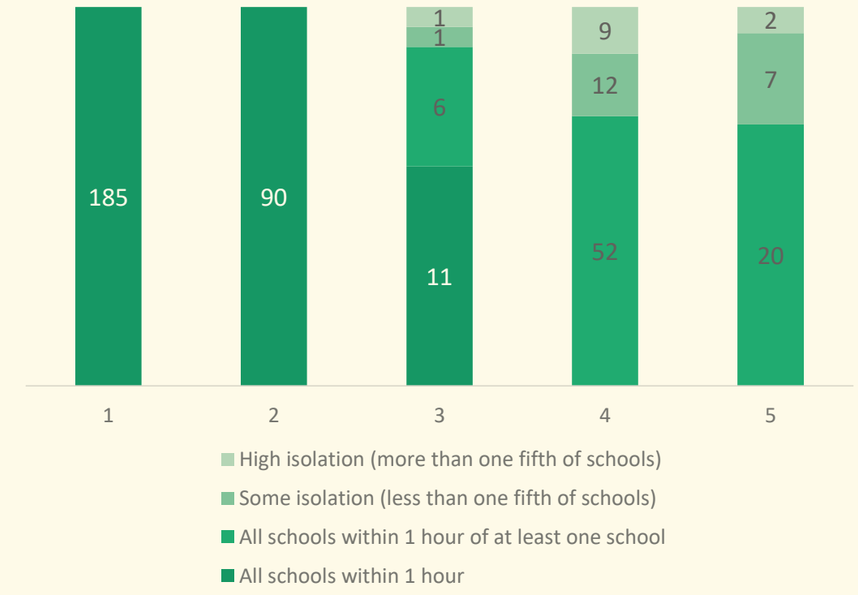
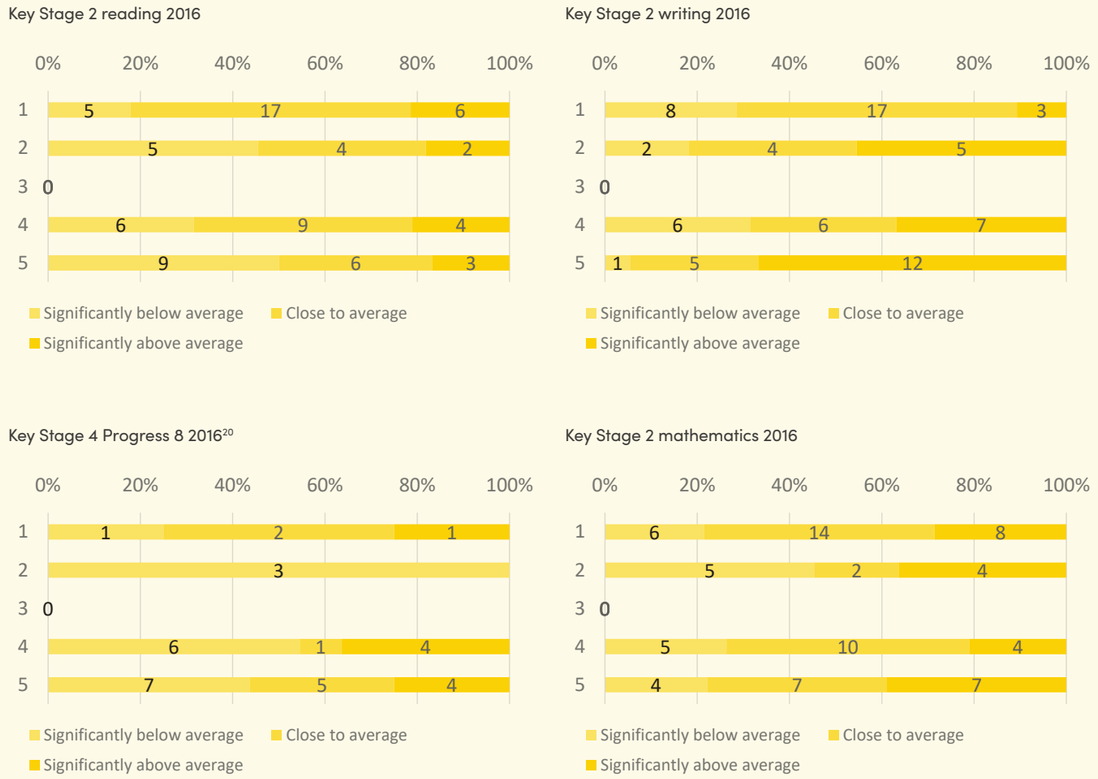


Figure 4.4: Current performance measures by MAT cluster



20 https://www.gov.uk/government/statistics/multi-academy-trust-performance-measures-2015-to-2016

Figure 4.5: Improvement measures by MAT cluster

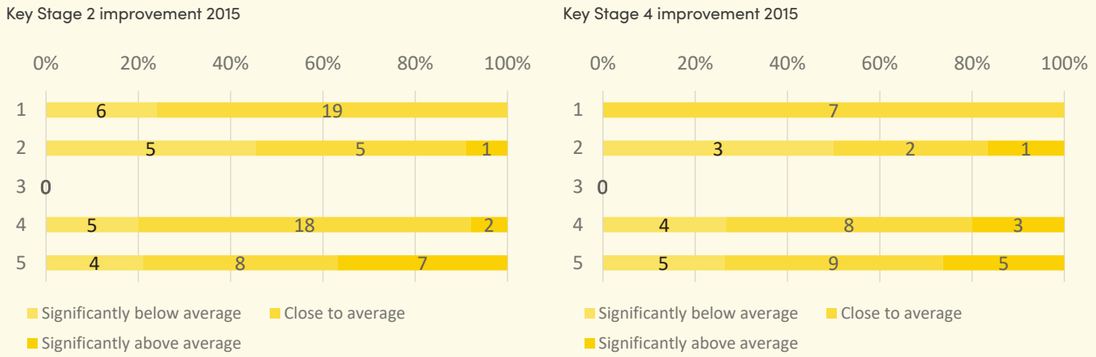


Figure 4.6: Performance of Pupil Premium pupils by MAT cluster

Figure 4.7: Number of trusts with schools rated as inadequate by MAT cluster

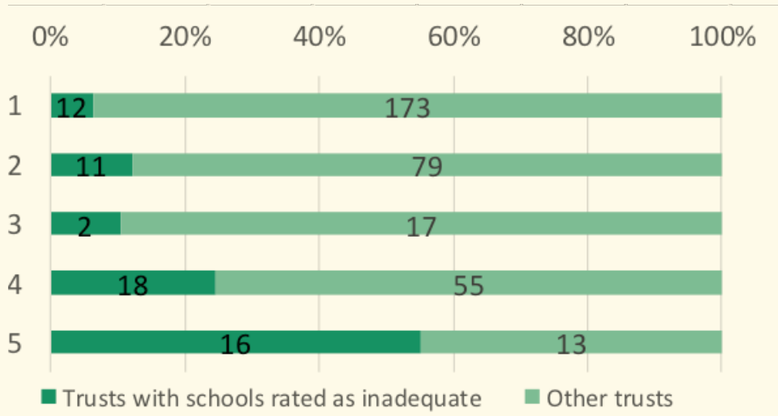
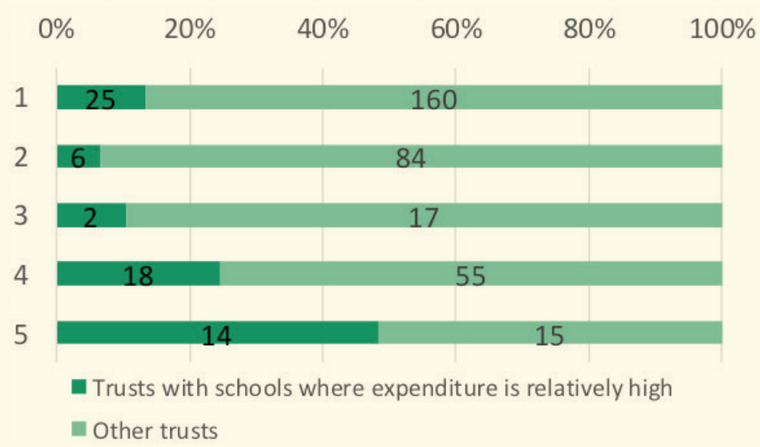


Figure 4.8: Number of trusts with schools with high expenditure by MAT cluster



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